



# SOUTHERN CLIMATE *MONITOR*

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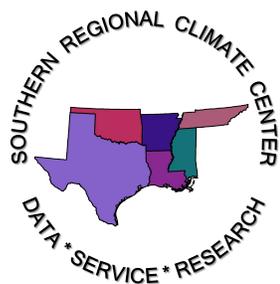
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## WEST NILE VIRUS IN THE SOUTHERN UNITED STATES

Charlotte Lunday, University of Oklahoma

Coming up on spring harkens back to the spring and summer of 2012, which saw a significant outbreak of West Nile Virus (WNV). WNV arrived in New York in 1999 and spread to the west by 2002. One year later, the U.S. saw a major outbreak of WNV with more than 260 human deaths in 2003. WNV outbreaks have not been as bad since then. That is, not until 2012. In 2012, there were more than 5000 symptom-causing cases in the United States. More than half of those were found in SCIPP states. In fact, nearly one-third of all cases in the U.S. were diagnosed in Texas. Why was 2012 so bad and what might the south expect this year? (CDC).

West Nile virus (WNV) activity reported to ArboNET, by state, United States, 2012 (as of December 11, 2012)



West Nile Virus (WNV) reports in the continental U.S. for the year 2012 as of December 11, 2012 from the Centers for Disease Control and Prevention WNV page: <http://www.cdc.gov/ncidod/dvbid/westnile/Mapsactivity/surv&control12MapsAnybyState.htm>

Given the severity of the 2012 WNV outbreak, many people have hypothesized about the reason WNV was so widespread this year. The most common theory is that the exceptionally warm year contributed to increased mosquito numbers and feeding activity (Walsh 2012). Where there are more mosquitoes and where mosquitoes eat more frequently, the disease is more easily transmitted. A study of temperature influences on

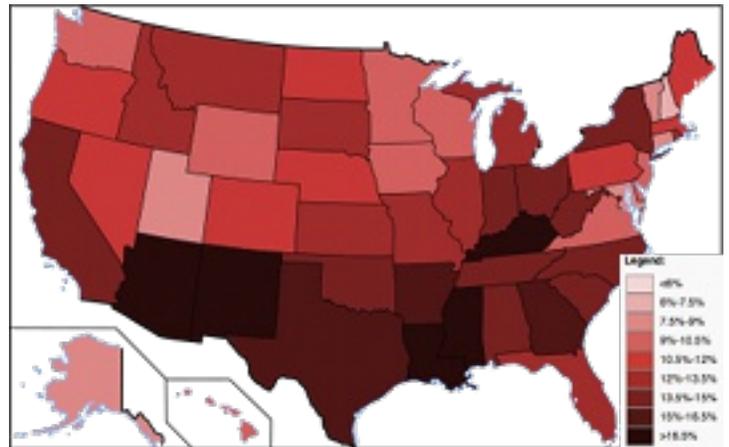
West Nile Virus in California (Hartley et. al 2012) suggests, however, that there are threshold temperatures at which mosquitoes will begin to die because it is too hot, so the high temperatures from the summer of 2012 may have contributed to small outbreak numbers in some areas, whereas they may have led to increased WNV diagnoses in other areas. Last year's drought is also thought to have contributed to the large number of infections.

It may seem counter-intuitive, but drought may shrink large bodies of water to shallower, stagnant pools better fit for mosquito larvae development. Extreme drought may decrease soil moisture to the extent that the area affected becomes uninhabitable for mosquitoes, but if there, in some instances, a balance can be struck so that drought may help mosquito growth. This may have been the case for Oklahoma and Texas – areas experiencing drought, but perhaps not to the same extreme that Kansas, a state with relatively few human WNV cases, did.

In general, rainfall is good for mosquito growth. Thunderstorms, on the other hand, that are accompanied by high winds may not be. Winds disturb water and destroy mosquito eggs. Calmer winds allow for more larvae to survive and reach adulthood.

Aside from favorable weather conditions, however, a few socio-economic factors also contribute to outbreak size. Individuals who spend a lot of time outside, such as construction workers and gardeners, are more at risk of being bitten by an infected mosquito, and according to the CDC, people over the age of 50 are more vulnerable to WNV disease. Oklahoma, Tennessee, and Arkansas have percentages of people aged 65 and older slightly higher than that of the national average, as reported by the 2010 Census. (CDC, U.S. Census).

Poverty also makes individuals more exposed to WNV. From lacking air conditioning (and thereby keeping windows and doors open) to less access to healthcare, people below the poverty level are more likely to contract and less likely to treat WNV. The percentages of people below the poverty level are higher than the national average in all six SCIPP states. In particular, Mississippi has approximately 10 percent more people under the poverty level than the national average. (U.S. Census).



**Poverty rates in the United States from 2008. Between 2007 and 2011, the percentage of the U.S. population was 14.3%. Image is open source from Wikipedia.**

Science suggests that climate change and increased globalization will make the southern U.S. more hospitable to tropical diseases such as WNV (Kilpatrick 2010; Walsh 2012). Planners will not only have to be mindful of weather conditions but also of susceptible populations in their states. Reducing WNV epidemics may involve increased public education measures, particularly to those who spend more time outside, as well as spraying pesticides in at-risk areas (although there is some debate about pesticides and environmental health). Even still, increased access to health care, such as mobile clinics in rural areas and underserved communities, may also be needed to combat not only WNV, but also other invasive diseases.

## References

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Centers for Disease Control and Prevention, cited 2013: West Nile Virus Media Facts [available online at [http://www.cdc.gov/ncidod/dvbid/westnile/resources/FightTheBite\\_FactSheet/MediaTools/jpgs/WNV%20media%20factsheet\\_natnl.jpg](http://www.cdc.gov/ncidod/dvbid/westnile/resources/FightTheBite_FactSheet/MediaTools/jpgs/WNV%20media%20factsheet_natnl.jpg)]

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Temperature on Emergence and Seasonality of West Nile Virus in California. *Am. J. Trop. Med. Hyg.* **85** 884-894.

Kilpatrick, A. M., 2010: Globalization, land use and the invasion of West Nile Virus. *Science* **334** 323-327.

United States Census Bureau, 2013: State and County Quick Facts [available online at <http://quickfacts.census.gov/qfd/index.html>]

Walsh, B., 2012: West Nile Virus is a Self-Inflicted Wound. *Time*, 21 August. [Available online at <http://science.time.com/2012/08/21/why-west-nile-virus-is-a-self-inflicted-wound/>]

## DROUGHT CONDITIONS

Luigi Romolo, Southern Regional Climate Center

Above average precipitation in central Oklahoma has lead to the removal of most of the exceptional drought that had resided there last month. There has also been a one-drought category improvement over much of the state in general. Elsewhere, drought conditions have not changed significantly. Severe and extreme drought conditions continue to plague the state of Texas, while the states of Louisiana, Mississippi, and Tennessee remain drought-free.

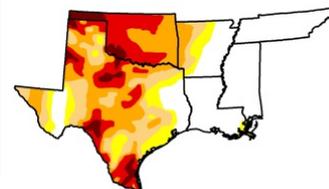
In Texas, as of March 1, 2013 reservoirs were at 67.0 percent of conservation storage, 2 percent less than the previous record and almost 5 percent less than 2012. Because of this, more regions of the state are attempting to curtail their water use. The Edwards Plateau region has approved a plan designed after the 1950s drought plan, estimated to cost between \$16 and \$18 million. With the onset of spring, harvesting and new planting is a concern for farmers. Dry soil moisture conditions near Wichita Falls and El Paso has caused farmers to pump groundwater and replant to keep their pecan, bean, and pea harvests from going under. Loss of grazing land over the last several months has caused ranchers to sell off their livestock and meat-packaging plants to close, costing two thousand jobs. Corn planting was down after increased corn prices were expected to boost numbers. Not all of the

## U.S. Drought Monitor

February 26, 2013  
Valid 7 a.m. EST

South

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	36.37	63.63	54.44	40.13	19.33	4.18
Last Week (02/19/2013 map)	36.26	63.74	53.89	39.86	24.59	9.53
3 Months Ago (11/27/2012 map)	20.96	79.04	63.53	45.32	26.83	8.44
Start of Calendar Year (01/01/2013 map)	21.18	78.82	63.69	50.50	32.80	10.98
Start of Water Year (09/25/2012 map)	24.13	75.87	66.61	51.50	29.86	9.11
One Year Ago (02/21/2012 map)	36.89	63.11	55.18	41.39	23.22	7.54



**Intensity:**  
■ D0 Abnormally Dry  
■ D1 Drought - Moderate  
■ D2 Drought - Severe  
■ D3 Drought - Extreme  
■ D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://droughtmonitor.unl.edu>

USDA  
 National Drought Mitigation Center  
 Released Thursday, February 28, 2013  
 Brian Fuchs, National Drought Mitigation Center

**Above: Drought conditions in the Southern Region. Map is valid for February 2013. Image courtesy of the National Drought Mitigation Center.**

state is in as poor condition, as recent snowfall in the Panhandle has helped replenish upper-level soil moisture and has farmers in the region optimistic. (Information provided by the Texas Office of State Climatology).

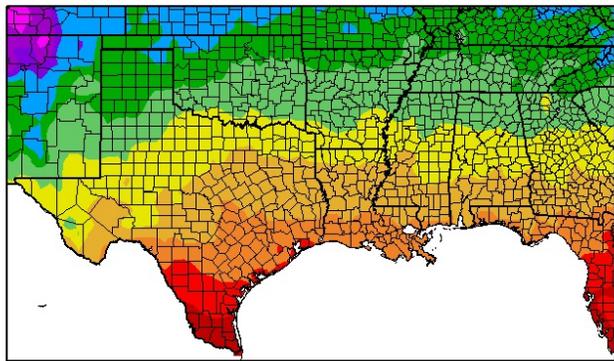
## TEMPERATURE SUMMARY

*Luigi Romolo, Southern Regional Climate Center*

February temperatures in the Southern Region varied from north to south, with the north experiencing a slightly cooler than normal month, while the southern half experienced yet another warmer than normal month. Average temperature anomalies did not sway too far from normal. In the north where it was cooler, temperatures averaged only a couple of degrees below expected values. In the south, temperatures averaged between 0 and 6 degrees F (0 to 3.33 degrees C) above

normal, with the highest anomalies occurring in the southern portions of Texas and along the Texas Gulf coast.

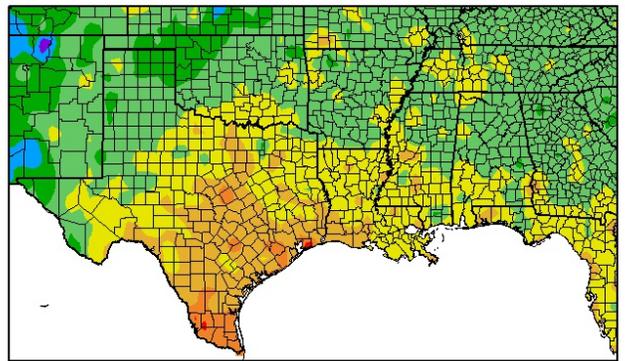
Temperature (F)  
2/1/2013 – 2/28/2013



Generated 3/5/2013 at HPRCC using provisional data.

Regional Climate Centers

Departure from Normal Temperature (F)  
2/1/2013 – 2/28/2013



Generated 3/5/2013 at HPRCC using provisional data.

Regional Climate Centers

**Average temperatures (left) and departures from 1971-2000 normal average temperatures (right) for February 2013, across the South.**

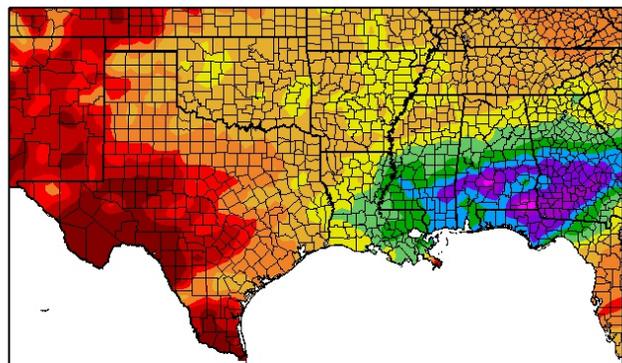
## PRECIPITATION SUMMARY

*Luigi Romolo, Southern Regional Climate Center*

February precipitation totals varied significantly over the Southern Region. In western Oklahoma and northwestern Texas, precipitation totals ranged from two hundred to over three hundred percent of normal. It should be noted, however, that these values equate to approximately 2 to 4 inches (50.8 to 101.6 mm) of precipitation. Conditions were also a lot wetter than normal in southern Mississippi and in southeastern Louisiana, where precipitation for the month ranged from one hundred and thirty to two hundred and fifty percent of normal. The precipitation totals ranged from 6 to 10 inches in southeastern Louisiana, to 10 to 12 inches (254.0

to 304.8 mm) in southern Mississippi. Conversely, it was quite dry throughout most of Tennessee, with precipitation totals there ranging from twenty-five to ninety percent of normal. Southern Texas was also extremely dry, particularly in the southwest and southern tip of the state. Most stations in those regions received less than five percent of normal precipitation, with many not seeing a drop of rain all month.

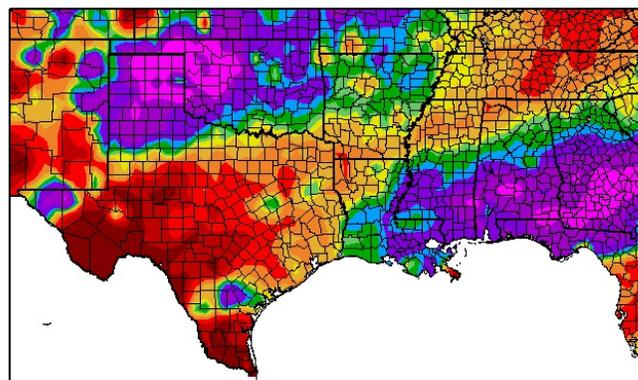
Precipitation (in)  
2/1/2013 - 2/28/2013



Generated 3/5/2013 at HPRCC using provisional data.

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Percent of Normal Precipitation (%)  
2/1/2013 - 2/28/2013



Generated 3/5/2013 at HPRCC using provisional data.

Regional Climate Centers

**Total precipitation values (left) and The percent of 1971-2000 normal precipitation totals (right) for February 2013.**

## WINTER RECAP -- WARM AND WET AT ALL SCALES

Barry Keim, Louisiana State Climatologist, Louisiana State University

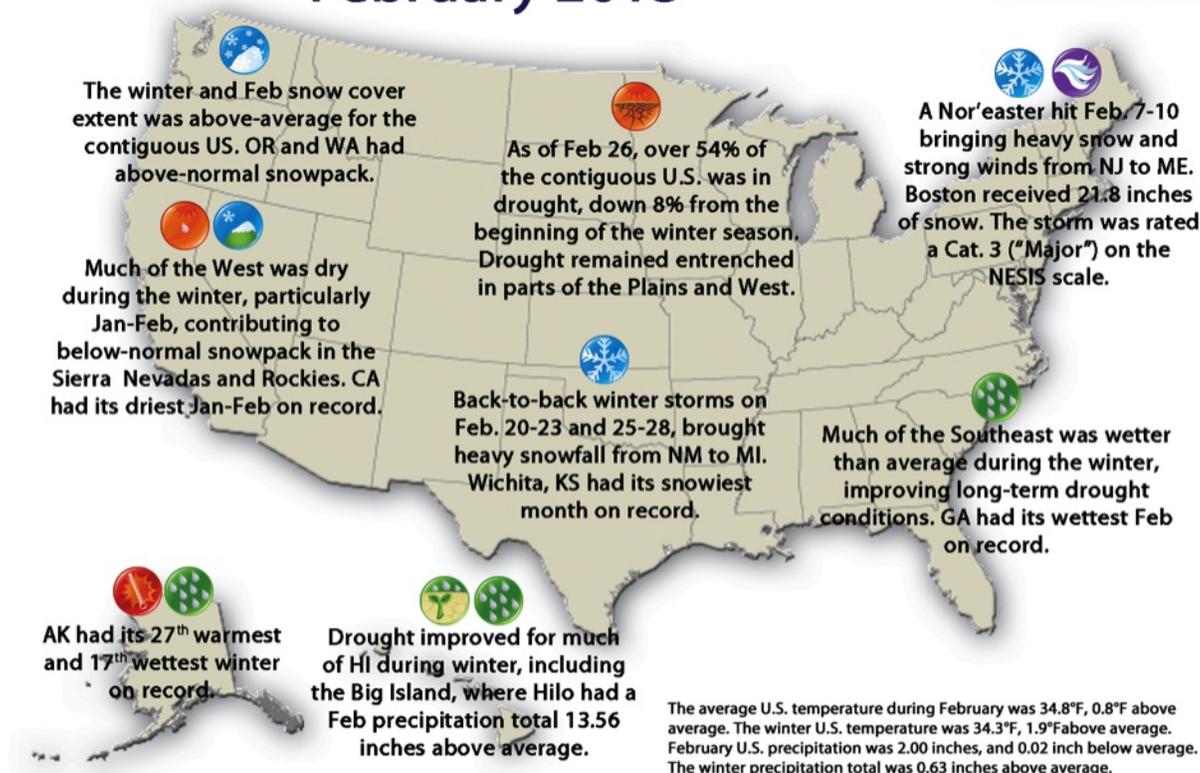
Warm and wet is how winter draws to a close in south Louisiana. Winter is defined here as the months of December, January and February. At New Orleans International Airport, the average winter temperature was 58°F, which was 4°F above normal. Rainfall totaled 18.9 inches over the three months, which was 2.5 inches above normal. For the State of Louisiana, we basically have the same story of warm and wet, which is of no big surprise. The Statewide average winter temperature for this past winter was 54°F, which was 3°F above normal. Statewide average precipitation totaled 22.6 inches, which was 6.6 inches above normal. NOAA has also released their report of this past winter for the conterminous

United States. The average winter temperature for the lower 48 States was 34.3°F, which was 1.9°F above normal, marking the 20th warmest winter on record since our record keeping began in 1895. Nationally averaged precipitation was 7.1 inches, which was 0.6 inches above normal. So, at all scales, local, Statewide, and National, the 2012-2013 winter will go down in the record books as warm and wet. A graphic summary of the significant events for winter and February 2013 is shown in Figure 1 below. If you have any questions, feel free to contact me at keim@lsu.edu.

### Significant Events for Winter and February 2013



To the Left:  
Weather highlights from this past winter. Graphic is from NOAA's National Climatic Data Center found at <http://www1.ncdc.noaa.gov/pub/data/cmb/images/us/2013/feb/monthlysig-eventmap-022013.gif>.



## CLIMATE PERSPECTIVE

State	Temperature	Rank	Precipitation	Rank
Arkansas	43.1	56 <sup>th</sup> Coldest	4.33	37 <sup>th</sup> Wettest
Louisiana	54.1	40 <sup>th</sup> Warmest	6.51	24 <sup>th</sup> Wettest
Mississippi	48.4	58 <sup>th</sup> Coldest	7.37	18 <sup>th</sup> Wettest
Oklahoma	40.8	55 <sup>th</sup> Coldest	3.06	12 <sup>th</sup> Wettest
Tennessee	40.8	55 <sup>th</sup> Warmest	2.85	23 <sup>rd</sup> Driest
Texas	51.5	41 <sup>st</sup> Warmest	1.29	41 <sup>st</sup> Driest

State temperature and precipitation values and rankings for February 2013. Ranks are based on the National Climatic Data Center's Statewide, Regional and National Dataset over the period 1895-2011.

## STATION SUMMARIES ACROSS THE SOUTH

Station Name	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	%Norm
El Dorado, AR	57.8	37.0	47.4	-0.9	69.0	2/10+	28.0	2/27+	3.00	-1.24	71
Little Rock, AR	53.9	35.8	44.8	0.0	71.0	2/10	23.0	2/1	0.05	1.42	143
Baton Rouge, LA	66	45.6	55.8	2.3	77.0	2/10	32.0	2/17	0.19	2.27	145
New Orleans, LA	65.6	49.9	57.7	2.0	76.0	2/10	37.0	2/17	0.33	1.74	132
Shreveport, LA	61.7	41.0	51.3	0.1	71.0	2/18+	31.0	2/16+	0.03	-1.53	64
Greenwood, MS	57.3	35.6	46.5	-1.9	70.0	2/6	24.0	2/16	3.82	-0.38	91
Jackson, MS	60.8	38.3	49.6	0.4	69.0	2/24+	26.0	2/17	8.86	4.36	197
Tupelo, MS	55.3	34.9	45.1	0.3	67.0	2/7+	24.0	2/17	3.72	-0.96	79
Oklahoma City, OK	53.8	31.5	42.6	0.3	71.0	2/17	19.0	2/1	2.72	1.16	174
Ponca City, OK	50.3	26.9	38.6	-1.1	72.0	2/17	15.0	2/23+	2.04	0.63	145
Tulsa, OK	52.4	29.7	41.0	-1.0	70.0	2/17	16.0	2/1	3.18	1.23	163
Knoxville, TN	51.7	30.2	40.9	1.0	62.0	2/27	17.0	2/17	1.80	-2.63	41
Memphis, TN	53.5	37.0	45.2	0.4	68.0	2/7	22.0	2/1	3.85	-0.46	89
Nashville, TN	52.2	32.6	42.4	1.1	66.0	2/25	17.0	2/1	2.58	-1.11	70
Amarillo, TX	52.5	27.1	39.8	-0.8	72.0	2/17+	15.0	2/13	2.53	1.98	460
El Paso, TX	60.8	34.7	47.8	-2.7	70.0	2/8	24.0	2/13	0.41	0.02	105
Dallas, TX	63.1	40.9	52.0	2.6	80.0	2/7	29.0	2/1	1.68	-0.69	71
Houston, TX	69.6	51.1	60.4	2.6	79.0	2/5	39.0	2/14	1.63	-1.38	54
San Antonio, TX	71.2	46.9	59.0	4.3	81.0	2/18+	31.0	2/16	0.10	-1.65	6

Summary of temperature and precipitation information from around the region for February 2013. Data provided by the Applied Climate Information System. On this chart, "depart" is the average's departure from the normal average, and "% norm" is the percentage of rainfall received compared with normal amounts of rainfall. Plus signs in the dates column denote that the extremes were reached on multiple days. Blue-shaded boxes represent cooler than normal temperatures; red-shaded boxes denote warmer than normal temperatures; tan shades represent drier than normal conditions; and green shades denote wetter than normal conditions.

**Disclaimer:** This is an experimental climate outreach and engagement product. While we make every attempt to verify this information, we do not warrant the accuracy of any of these materials. The user assumes the entire risk related to the use of these data. This publication was prepared by SRCC/SCIPP with support in part from the U.S. Department of Commerce/NOAA. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of NOAA

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The *Monitor* is an experimental climate outreach and engagement product of the Southern Regional Climate Center and Southern Climate Impacts Planning Program. To provide feedback or suggestions to improve the content provided in the *Monitor*, please contact us at [monitor@southernclimate.org](mailto:monitor@southernclimate.org). We look forward to hearing from you and tailoring the *Monitor* to better serve you. You can also find us online at [www.srcc.lsu.edu](http://www.srcc.lsu.edu) and [www.southernclimate.org](http://www.southernclimate.org).

For any questions pertaining to historical climate data across the states of Oklahoma, Texas, Arkansas, Louisiana, Mississippi, or Tennessee, please contact the Southern Regional Climate Center at 225-578-502. For questions or inquiries regarding research, experimental tool development, and engagement activities at the Southern Climate Impacts Planning Program, please contact us at 405-325-7809 or 225-578-8374.